

# **Water Quality Challenges in the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary: EPA's Action Plan**

(Draft 6/05/12)

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## **Executive Summary**

The Bay-Delta Estuary is one of the largest and most important estuarine systems on the

Pacific Coast of the United States, supporting over 750 animal and plant species. For more than 25 years, the decline of aquatic resources in the Estuary, along with the corresponding impacts on urban and agricultural water districts who rely on water exported from the Estuary, has drawn increased attention from federal, state and local agencies responsible for addressing these related problems. The most recent drought (2006-2009) highlighted the increasing fragility of both ecosystem health and water supply reliability.

The U.S. Environmental Protection Agency (EPA) is one of more than 25 state and federal governmental agencies with responsibilities in the Bay Delta Estuary. EPA's major statutory mission in the Estuary is to implement the federal Clean Water Act (CWA). The operative provisions of the Clean Water Act are classic federalism, where States serve as the primary implementers of the CWA, with EPA providing significant financial support<sup>1</sup> and technical assistance as States develop their own programs. Where appropriate, as in California, EPA delegates CWA program authority to the State while providing ongoing oversight (including, in some cases, review and approval of State actions).

In the Bay Delta Estuary, EPA's work under the Clean Water Act focuses on assuring that the many designated uses of the Estuary's aquatic resources are protected. EPA emphasizes the CWA goals of maintaining and improving water quality – the chemical, physical, and biological integrity of the water – to ensure the Bay Delta Estuary can function as a vibrant, healthy estuary. About 90 species of fish are found in the Delta. The Delta's channels serve as a migratory route and nursery area for Chinook salmon, striped bass, white and green sturgeon, American shad, and steelhead trout. These anadromous fishes spend most of their adult lives either in the lower bays of the estuary or in the ocean. Other resident fishes in the estuary include delta smelt, longfin smelt, Sacramento splittail, catfish, largemouth bass, black bass, crappie, and bluegill. All Bay Delta Estuary waters are impaired by one or more contaminant. In addition, the reduction in the quantity and quality of estuarine habitat limits the Estuary's ability to support the aquatic species designated uses.

In this document, EPA recommends actions to restore water quality for aquatic species protection using the Agency's existing authorities and resources, as well as actions EPA believes are important and appropriate for other State or Federal agencies. EPA developed this Action Plan based on an assessment of the effectiveness of the current regulatory mechanisms designed to protect water quality in the Delta and its tributaries. EPA's assessment suggests that CWA programs currently are not adequately protecting the aquatic resources of the Estuary.

EPA's Action Plan includes a suite of activities which together will contribute to the restoration of the Bay Delta Estuary:

1. Improving water quality standards to protect estuarine habitat
2. Advancing regional water quality monitoring and assessment
3. Accelerating Water Quality Restoration through Total Maximum Daily Loads
4. Strengthening Selenium Water Quality Criteria
5. Preventing pesticide pollution
6. Controlling mercury methylation in wetlands

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<sup>1</sup> In federal fiscal year 2011, EPA grants to the State Water Resources Control Board totaled \$128,423,000. Of this, \$105.6 million was a capitalization grant to the State Revolving Fund. The other grants were under the authority of CWA Sections 106, 319(h) and 604(b).

## 7. Supporting the Bay Delta Conservation Plan

### Background

In response to the most recent drought and resulting conflicts in California water resource management, EPA joined five other federal agencies in issuing the Interim Federal Action Plan (IFAP) in December 2009.<sup>2</sup> The IFAP described actions each agency would take, in partnership with the State of California, to address the many interrelated water issues associated with the Bay Delta Estuary. As part of this interagency effort, EPA committed in the IFAP to “assess the effectiveness of the current regulatory mechanisms designed to protect water quality in the Delta and its tributaries, including standards for toxics, nutrients, and estuarine habitat protection.”

As a first step in this assessment, on February 10, 2011, EPA issued an Advanced Notice of Proposed Rulemaking for Water Quality Challenges in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (ANPR) (attached as Appendix III). This ANPR summarized the status of aquatic species of concern in the Bay Delta Estuary; the current scientific and technical understanding of seven major stressors affecting those aquatic resources; and the state of the regulatory response to the dramatic decline in those resources. The seven stressors EPA considered of most significance included: ammonia, selenium, pesticides, contaminants of emerging concern, declining estuarine habitat, fragmented migratory corridors and wetlands loss. The purpose of the ANPR was to solicit comment from the public and other agencies on what EPA might do differently in implementing the programs under its purview – most notably the Clean Water Act – to address these named stressors for which EPA has some existing authority.<sup>3</sup>

In response to the ANPR, EPA received 55 comments from a range of state, local and federal agencies, nongovernmental organizations and individuals. Some of these comments provided technical information or scientific research not reflected in the ANPR. Some comments included suggestions for new or augmented EPA activities in the Bay Delta Estuary. Other comments disagreed with EPA’s findings and suggested that further regulatory action was unnecessary. The comments are summarized in Appendix II<sup>4</sup>. In addition, in Appendix I, for each specific water quality issue discussed in the ANPR, key points from the comments are highlighted.

Based on the ANPR and the comments received, as well as on more recent scientific and technical information, EPA is now: (1) summarizing certain conclusions about the current regulatory mechanisms protecting water quality in the Bay Delta Estuary; and (2) setting forth EPA’s priorities and commitments to improve water quality for aquatic species in the Bay Delta Estuary. This document does not answer all of the questions raised in the ANPR, nor does it attempt to provide a comprehensive blueprint for solving all of the problems in the Bay Delta

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<sup>2</sup> INTERIM FEDERAL ACTION PLAN FOR THE CALIFORNIA DELTA (Dec 22, 2009)  
[http://www.doi.gov/news/pressreleases/2009\\_12\\_22\\_releaseA.cfm/index.cfm](http://www.doi.gov/news/pressreleases/2009_12_22_releaseA.cfm/index.cfm)

<sup>3</sup> EPA’s review was focused on the most significant water quality factors adversely affecting aquatic species in the Bay Delta Estuary. This document does not address water quality issues related to other designated uses, including uses related to drinking water (which is also protected under the Safe Drinking Water Act which EPA implements with the California Department of Public Health), recreation, fish consumption, agriculture, etc. EPA acknowledges the ongoing need to evaluate and address these other critical water quality issues.

<sup>4</sup> also posted at <http://www.epa.gov/sfbay-delta/anpr-pubcomments.html>

Estuary. Instead, this document defines EPA's priorities in the Bay Delta Estuary and recommends changes in EPA (or other agency) activities or policies, given our current authorities and our understanding of the threats to aquatic resources.

This review focuses on the CWA, the primary federal statute protecting water quality. Where relevant, other federal laws which provide EPA additional tools are discussed. These include pesticide regulation under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); chemical regulation under the Toxic Substances Control Act (TSCA); remediation of sites contaminated with hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or "Superfund"); and the review of Environmental Impact Statements for federal projects under the National Environmental Policy Act (NEPA)<sup>5</sup>. In addition, California has significantly broader authority under its Porter-Cologne Act (such as the authority to regulate agricultural discharges and discharges to ground water) and under State pesticide law, which provide authorities to control pesticide use and protect surface water from pesticide residues. These State authorities provide critical tools to supplement federal law.

As discussed in detail in the ANPR, the regulatory response to water quality issues in the Bay Delta Estuary is complex. This is due in part to the nature of the problem, and in part to the multi-layered and sometimes fragmented regulatory structure in California, where the task of identifying water quality goals and defining and implementing regulatory solutions is shared by the State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards), as well as between the water quality and water rights functions of the State Board.<sup>6</sup>

Other state and federal agencies also serve important functions which intersect or impact that of EPA and the Water Boards. The California Department of Water Resources and the federal Bureau of Reclamation, as water management agencies, provide water to their contractors and are subject to water quality and endangered species laws. The natural resource agencies (California Department of Fish and Game and the federal Fish and Wildlife Service and National Marine Fisheries Service) have responsibility and authority to recover threatened and endangered species. As the Clean Water Act (and state water quality law) protects all beneficial uses of water, including aquatic habitat, ESA measures to protect aquatic threatened and endangered species can overlap with State and/or federal CWA requirements. In addition, the State Department of Pesticide Regulation implements programs to protect surface water from the impacts of pesticides, a role which they undertake in coordination with the Water Boards. The U.S. Army Corps of Engineers, with assistance and oversight by EPA, issues permits for activities that unavoidably fill waters and wetlands.

## **The bigger picture**

Any solution to the complex ecological problems of the Bay Delta Estuary must be multi-

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<sup>5</sup> NEPA requires Environmental Impact Statements (EIS) for major federal actions significantly affecting the environment. Clean Air Act Section 309 mandates EPA's review and comment on EISs prepared by other federal agencies.

<sup>6</sup> Noting this complex structure is intended as criticism. Under the federalism concept of the Clean Water Act, EPA is respectful of how each state organizes its various water quality functions, as long as the goals of the Clean Water Act are attained.

faceted, including providing sufficient flows, physical habitat which is sufficiently large, connected, diverse, and self-sustaining, as well as a reduction of other stressors, such as contaminants, invasive species, and predation. There are several processes underway to improve Bay Delta Estuary resources and stabilize water supplies. Notable among these are the Bay Delta Conservation Plan (BDCP) and the Delta Plan.

The BDCP is a multi-agency (state, federal and local water districts) effort to recover endangered species and ensure a reliable water supply through reconfiguring export water conveyance facilities and restoring large-scale aquatic habitat. EPA is supporting the development of the Bay Delta Conservation Plan by participating as a cooperating agency in its environmental review process. EPA's input is focused on ensuring that water quality impacts of conveyance changes are analyzed and appropriately considered and that information needed for CWA permitting is developed as early as possible. (see page 21 for additional comments related to the BDCP.)

The Delta Plan, to be finalized by the Delta Stewardship Council (DSC) in 2013, will include a set of legally-enforceable state policies intended to achieve the State's policy of "co-equal goals", i.e., a more reliable water supply and a restored and enhanced the Delta ecosystem. Although the role of the Delta Plan in regulatory activities affecting the Bay Delta Estuary is evolving, EPA supports this state effort for comprehensively addressing the multiple goals inherent in Delta protection, and especially the importance it places on the State Water Board's work to promulgate new Delta water quality standards. **MORE KUDOS?**

In addition, many other agencies and organizations are working to improve Bay Delta Estuary water quality and aquatic species protection, pursuant to their authorities and responsibilities. Some of these efforts include: **ADD CITES FOR BELOW?**

- Department of Fish and Game's draft Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone (7/2011) and draft Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta (10/2010);
- Delta Conservancy's draft Strategic Plan (3/2012);
- San Joaquin River Restoration Program (as authorized in 2009) ;
- Central Valley Flood Protection Board's draft Central Valley Flood Protection Plan (3/2012); and
- Natural Resource Conservation Service's Bay-Delta Initiative.

There have also been recent efforts to assess the health of the ecosystem and the success of efforts to address Delta issues, from policy and scientific perspectives, including:

- Delta Regional Monitoring Program's first annual Pulse of the Delta (3/2011) produced by the Central Valley Regional Water Quality Control Board;
- San Francisco Estuary Partnership's State of the Estuary report (9/2011);
- Public Policy Institute of California's series of reports<sup>7</sup>;
- Delta Vision Foundation's 2011 Delta Vision Report Card;

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<sup>7</sup> PPIC published *Envisioning Futures for the Sacramento-San Joaquin Delta* (2007); *Comparing Futures for the Sacramento-San Joaquin Delta* (2008); *Managing California's Water: From Conflict to Reconciliation* (2011); and *Water and the California Economy* (2012). <http://www.ppic.org/main/policyarea.asp?i=15>

- National Research Council's three scientific reviews of the basis of the actions taken and those that could be taken to achieve a sustainable ecosystem and a reliable water supply<sup>8</sup>; and
- Interagency Ecological Program's Pelagic Organism Decline Synthesis (December 2010)<sup>9</sup>.

In developing this Action Plan, EPA considered these other activities and processes. EPA's intent is to complement and, where possible, support the efforts of these other organizations.

## **Assessing the Clean Water Act Regulatory Response**

The ANPR describes CWA and State water quality programs that can be used to protect aquatic species in the Bay Delta Estuary, from establishing water quality standards to using various programs and regulatory tools (e.g., discharge permits, enforcement, TMDLs, financial assistance) to ensure those standards are met. EPA considered the information in the ANPR and the subsequent public comments in identifying water quality issues which are not effectively being addressed. EPA also considered the 2009 Periodic Review of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta WQCP) completed by the State Water Board and the 2011 Triennial Review of the Sacramento River-San Joaquin River Basin Plan completed by the Central Valley Regional Water Board in 2011. The conclusions of these reviews are consistent with EPA's findings.

Overall, EPA found that although there is much ongoing activity, CWA programs are not adequately protecting Bay Delta aquatic resources, as evidenced by the current low populations of several fish species. That said, the Water Boards have initiated work on the most significant tasks and are making steady progress. Other agencies have also strengthened relevant regulatory programs. Most notably, the Department of Pesticide Regulation issued regulations in 2011 to prevent surface water contamination by pesticides in non-agricultural settings.

In 2008, in response to the Bay Delta Estuary aquatic resource decline, the State Water Board, together with the Central Valley and San Francisco Bay Water Boards, adopted a five-year Strategic Workplan<sup>10</sup> targeting their collective efforts towards a suite of priority activities to help address the ecological crisis. The Workplan included flow-related and water quality actions, deploying CWA tools as well as the use of broader State authorities. For instance, the State Water Board's administration of water rights goes well beyond CWA authority and is a critical component of ensuring flow of adequate quality, quantity, and timing to sustain aquatic species. The Workplan was an important effort to articulate priorities and reinforce collaboration between the three Water Board offices.

The Boards have accomplished much since the Workplan was adopted, and have

<sup>8</sup> NRC published 3 reports available at <http://www8.nationalacademies.org/cp/projectview.aspx?key=49175>

<sup>9</sup> IEP's POD workplans and syntheses are at: [http://www.water.ca.gov/iep/pod/synthesis\\_reports\\_workplans.cfm](http://www.water.ca.gov/iep/pod/synthesis_reports_workplans.cfm)

<sup>10</sup>

[http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/strategic\\_plan/docs/baydelta\\_workplan\\_final.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/strategic_plan/docs/baydelta_workplan_final.pdf)

periodically reported progress to the State Board<sup>11</sup>. Several major actions called for in the Workplan have been completed, notably: **DID I LEAVE ANYTHING KEY OUT?**

- Additional science was undertaken to better understand potential effects of ammonia on aquatic species. The Board's findings supported the issuance of an improved new discharge permit to the Sacramento Regional County Sanitation District wastewater treatment facility;
- The challenging and controversial Delta Methylmercury TMDL was adopted and implementation has begun;
- Key steps were taken toward developing a Delta Regional Monitoring Program, including publishing the first Pulse of the Delta report;
- New flow objectives to support migratory fish populations for the San Joaquin River and tributaries were proposed and are anticipated for adoption in 2013.

Although not in the Workplan, the Board produced Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Flow Criteria in August 2010, as mandated by the 2009 Delta Reform legislation. This was a significant effort that produced useful science, though other activities were delayed as a result.

Despite the State's comprehensive water quality program and the progress they have made, there are several efforts which have fallen behind the original Workplan schedule, either due to resource constraints, unforeseen tasks (such as the Flow Criteria), or lengthy public process. Of most significance, the State Board only recently initiated its comprehensive review of the 2006 Water Quality Control Plan, including Delta flow objectives. This was originally scheduled for completion in mid-2010, with implementation to begin by the end of 2011. The development of financial and governance options for the long-term Delta RMP has also been delayed. Lastly, though the Workplan set priorities for TMDL development and implementation, resources have not been sufficient to aggressively implement all of the adopted TMDLs (27) while concurrently developing new TMDLs (15 underway) to address other impairments. The Water Boards lack protocols for tracking progress on TMDL activities, providing regular updates on the status of achieving load limits, or connecting water quality monitoring data with TMDL progress.

As the 2008 Workplan was envisioned as a five year plan, the Water Boards should consider updating it. Current knowledge of ecosystem stressors may suggest different or additional priorities. For example, the Board might consider assigning priority to the development of site-specific temperature criteria, given how critical temperature is to fish in the San Joaquin. The Central Valley Regional Board has stated that its current narrative temperature objective is not adequately protective of anadromous fish, particularly during early life stages<sup>12</sup>, a conclusion also supported by California Department of Fish and Game and NOAA-Fisheries. An updated Workplan might also reflect the Central Valley Board's Irrigated Lands Regulatory Program (ILRP), where the State is working with Water Quality Coalitions throughout the Central Valley to control farm run-off through water quality monitoring of receiving water and corrective actions when impairments are found. The ILRP goes beyond the authorities of the

<sup>11</sup> [www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/element\\_actions/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/element_actions/)

<sup>12</sup> [www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/2011\\_tr\\_workplan.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/2011_tr_workplan.pdf) (page 35)

CWA in addressing agricultural discharges to surface water and groundwater and is critical to addressing the biggest source of nonpoint source pollution to the Estuary.

In addition, EPA encourages the Water Boards to more fully and specifically identify impairments to Bay Delta Estuary water quality where a designated use is impaired or a narrative standard is exceeded. One of the foundations of the CWA program is the biennial evaluation of water quality impairments included in the Integrated Water Quality Monitoring and Assessment Report under Sections 303(d) and 305(b) (“Integrated Report”). The Integrated Report serves as the starting point for identifying waterbodies with water quality problems, assessing the cause of the problems, and proposing a remedial approach. Where a particular pollutant is believed responsible, a TMDL may be needed. If other factors are causing the impairment, different approaches may be more appropriate. Integrated Reports have tended to focus on impairments that are measurable by numeric objectives. In the Bay Delta Estuary, many of the beneficial uses are defined by ecological function (fish migration, warm freshwater habitat, etc.) or are protected by narrative objectives (anadromous fish doubling). Identifying impairments of these beneficial uses or violations of narrative objectives is complex. Nevertheless, the failure to do so results in a distorted picture of the status of water quality in the Bay Delta Estuary. EPA will work with the Water Boards to address this problem during the next (2014) Integrated Report cycle. As the information in the ANPR and this Action Plan suggests, many of the designated uses in the Bay Delta Estuary are impaired. Identifying those impairments and identifying the cause (whether it is a “pollutant” for purposes of Section 303(d) or some other cause) is a critical part of the Clean Water Act response to the Estuary’s problems.

The State Water Board is also developing state-wide policies and general permits that will benefit the Bay Delta Estuary. In some areas, the State is undertaking groundbreaking work. For example, California's draft Toxicity Policy proposes new toxicity evaluation methods (“whole effluent toxicity”) which will more effectively diagnose water quality problems caused by pesticides and other toxicants. Other state-wide policies being developed include: Nutrients (including guidance on developing numeric nutrient endpoints); Biocriteria (i.e., biological objectives that will provide narrative and numeric benchmarks to describe conditions necessary to protect aquatic life beneficial uses); and Methylmercury (including water quality criteria based on fish-tissue concentrations protective of human health).

In the face of complex ecological problems, declining budgets and a high degree of public and political interest, the Water Boards have accomplished much. They have targeted their efforts at the most crucial tasks and are making steady progress. EPA has identified where it can support the State in these priority areas and these constitute much of EPA’s Action Plan, below.

## **EPA’s Action Plan**

EPA believes the activities highlighted below are the most significant steps, within EPA’s authorities and resources, toward restoring water quality and aquatic species health in the Bay Delta Estuary. Prioritizing the many stressors on the Bay Delta Estuary is difficult. The scientific community has not identified any single stressor as primarily responsible for diminishing fish populations. Instead, scientists on the Delta Stewardship Council's Independent Science Board, the Interagency Ecological Program, and the National Research Council describe contaminant and habitat stressors in the Bay Delta Estuary as inter-related and synergistic, with wide annual variability. Informed by these experts, EPA has concluded, from the perspective of



the Clean Water Act, that updating the estuarine habitat water quality standard in the Bay-Delta WQCP is the most critical action for protecting aquatic life in the Bay Delta Estuary. We are committed to supporting the State Water Board as they undertake this important work.

Over the last decade, there has been much regulatory activity related to contaminant stressors, including pesticides, selenium, low dissolved oxygen, and ammonia. By contrast, the estuarine habitat water quality standard has not been updated for seventeen years. Flow is a primary driver of physical habitat conditions, including turbidity, temperature, dissolved oxygen, and nutrient loading. In addition, the impacts of contaminant stressors are significantly altered by flow, as flows determine residence time, concentrations of contaminants, exposure duration and the salinity, temperature, and turbidity conditions that alter the chemistry and biological availability of contaminants.

This Action Plan relies on State and EPA complementary actions. As previously stated, the State and Regional Water Boards are the primary implementers of the CWA in California. EPA works closely with the Water Boards to develop a common understanding of how the resources and authorities of the CWA, supplemented by the State's additional resources and authorities, will be used to achieve mutual goals. EPA has consulted with the Water Boards in developing these recommendations and will continue this collaboration to continually address the priority water quality issues in the Estuary. EPA will evaluate progress on the proposed actions as well as the underlying science and evolving understanding of aquatic resource protection in the Bay Delta Estuary so that agency activities are always targeted to the most critical needs.

EPA recognizes that the next twenty years will be a period of significant change in the Bay Delta Estuary. Some changes will be the result of human decision (or non-decision) and are controllable – Delta conveyance, pollution, future invasive species, land use. Other changes are beyond local control – climate change, earthquakes, legacy pollution, existing invasive species, population growth. While our response to these uncontrollable stressors will be mainly adaptation, any plans to restore the Estuary also needs to consider these likely threats.

Appendix I is a more complete discussion of each of the water quality issues in the ANPR, including highlights from public comments, EPA's assessment of the regulatory response to each issue, and areas where EPA believes additional focus by EPA, the State and Regional Water Boards, and/or another agency would be helpful. **TH-better transition**

## **1. Estuarine habitat water quality standard**

**The State Water Board should expeditiously review and modify the estuarine habitat standard in the Bay Delta Water Quality Control Plan to more fully protect aquatic species. EPA concurs with the timeframe set for this action by the Delta Stewardship Council of June 2014. EPA will assist the SWRCB in evaluating recent scientific work as it considers new standards to protect estuarine habitat.**

In 1991, the State Water Board designated Estuarine Habitat as a beneficial use of the waters in the Bay Delta Estuary. In 1995, the State Water Board established a Delta outflow standard designed to protect estuarine habitat and fisheries. This outflow standard<sup>13</sup> was designed to

<sup>13</sup> The history and background of the X2 standard is discussed at length in the ANPR at pp. 52-56 and the associated footnotes.

mimic the relationship between springtime precipitation and the geographic location and extent of estuarine habitat as had occurred in the late 1960s and early 1970s and was adopted as a springtime standard only; no attempt was made at that time to define standards explicitly protecting the estuarine habitat designated use during other times of the year.

From 1995 to 1999, there was a significant recovery of migratory and resident Delta fish populations, probably due primarily to a series of wet springs and probably helped by the newly implemented water quality standards. In about 2000, however, many critical pelagic species suffered an unexpected and dramatic decline (the “pelagic organism decline” or “POD”). This time period coincided with increases in fall pumping in the south Delta. Since then, during fall (except 2011), the low salinity zone has been consistently in the western Delta where poor quality estuarine habitat is compressed into modified, inhospitable river channels. Consequently, no matter how favorable conditions might be for pelagic fishes during the winter and spring, they have been forced into unfavorable estuarine habitat during the fall. The POD prompted wide ranging scientific investigations.<sup>14</sup>

In 2009, the State Water Board conducted a Periodic Review of the 2006 Bay-Delta WQCP. The Periodic Review concluded that “[t]he available information indicates that further review and change of Delta outflow objectives may be required. Changes to Delta outflow patterns have likely contributed to the POD and are likely having an impact on the abundance of other species of concern...Based on current scientific information, recent regulatory actions, and expected recommendations from agencies and stakeholder groups, staff recommends the State Water Board conduct a detailed review of the Delta outflow objectives for possible revisions to the Bay-Delta Plan. Any revisions should also consider the need for Delta inflows.”<sup>15</sup>

Over the last several years, the State Water Board has focused on the initial phase of the WQCP revision related to the Southern Delta Salinity and San Joaquin River Flow Objectives. Now that this first phase is nearing completion, on January 24, 2012, the Board initiated the process to review the remaining parts of the WQCP, including Delta outflow objectives (i.e., “X2”), with a goal of Board adoption of a revised WQCP by June 2014. Although this lags significantly behind the late 2011 date established in the Board’s Strategic Workplan, EPA is encouraged by the Board’s current commitment to this task.

The State Water Board’s WQCP review has received significant attention. For example, the Delta Stewardship Council’s draft Delta Plan includes a policy requiring the State Water Board (a) adopt and implement updated flow objectives for the Delta by June 2014; and (b) develop flow criteria for high-priority tributaries to the Delta by June 2018.

To assist the Board in harnessing the considerable scientific research done since 1995, EPA convened a technical workshop in March 2012 to assemble information on how biological indicators and ecological processes change in response to different locations of the low salinity zone. Input received at the Workshop will be compiled and submitted to the State Water Board during their upcoming proceedings. EPA also provided initial scoping comments in April recommending that the Board consider standards to protect year-round conditions of physical factors that directly affect aquatic resources and which can be monitored and assessed in a way

<sup>14</sup> [http://www.water.ca.gov/iep/pod/synthesis\\_reports\\_workplans.cfm](http://www.water.ca.gov/iep/pod/synthesis_reports_workplans.cfm)

<sup>15</sup> Staff Report, Periodic Review of the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-Estuary, at p. 19.

that will facilitate future review. An important aspect of this is developing metrics/performance measures to determine if the water quality objectives are contributing to a healthier ecosystem, and an adaptive management plan to support future revisions. EPA will continue to provide assistance and recommendations as the Board proceeds.

Additional detail may be found in Appendix I beginning at page 29.

## **2. Regional Water Quality Monitoring and Assessment Program**

**EPA supports the establishment of Regional Water Quality Monitoring and Assessment Programs (RMPs) in the Central Valley. EPA applauds the Central Valley Water Board's commitment to develop a Delta RMP, and will provide funding for the second annual (2012) Pulse of the Delta report. With the Water Board, EPA will continue its support of an RMP in the San Joaquin.**

A significant hindrance to improving water quality in the Delta and in the larger Central Valley is the lack of an effective and efficient system for collecting and assessing water quality data. There are many active monitoring programs in the Delta and its watersheds, most of which are narrowly focused to satisfy specific regulatory requirements. Some contaminants are monitored regularly, others occasionally or not at all. There is little standardization of monitoring procedures, data quality assurance or presentation protocols. Data is not accessible through a single database and some data are not accessible electronically. Most significantly, there is no regular attempt to integrate data into a meaningful assessment of water quality. The current situation makes it difficult to obtain timely access to monitoring results, to combine data for broader analyses and to strategically target and assess the effectiveness of corrective measures.

California has seen the success of regional monitoring programs in the San Francisco Bay, on the Southern California coast, and elsewhere. In the Bay Delta Estuary, since 1970, the Interagency Ecological Program (IEP) has provided the foundational science for management activities. Though its contributions to understanding aquatic resources in the estuary have been invaluable, the IEP has not focused extensively on contaminants. When IEP launched its investigation of the Pelagic Organism Decline (POD) in 2005, it was apparent that the lack of any comprehensive assessment of water quality information impeded the understanding of the causes of the decline. The Water Boards commissioned a study by UC Davis to synthesize existing contaminants data. The study concluded that there were insufficient high quality data to make conclusions about the potential role of specific contaminants in the POD.<sup>16</sup> A functioning RMP would include regular data assessment, better preparing us to answer critical management questions.

The goals of a regional monitoring program are supported by many. The federal agencies, in their December 2009 Interim Federal Action Plan, committed to work together and with California to develop a comprehensive regional water quality monitoring and assessment program in the Delta and its tributaries.<sup>17</sup> In 2006, the California legislature established a Water

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<sup>16</sup> Evaluation of chemical, toxicological, and histopathologic data to determine their role in the pelagic organism decline. *Available at:* [http://www.swrcb.ca.gov/rwqcb5/water\\_issues/delta\\_water\\_quality/comprehensive\\_monitoring\\_program/contaminant\\_synthesis\\_report.pdf](http://www.swrcb.ca.gov/rwqcb5/water_issues/delta_water_quality/comprehensive_monitoring_program/contaminant_synthesis_report.pdf)

<sup>17</sup>Interim Federal Action Plan at page 15. *Available at:* <http://www.doi.gov/documents/CAWaterWorkPlan.pdf>

Quality Monitoring Council to improve the State's system for collecting information on its water resources and to make that information available to decision makers and the public. In its 2010 Comprehensive Water Quality Monitoring Program Strategy for California, the Council endorsed the California Environmental Data Exchange Network (CEDEN) as the mechanism for bringing monitoring data together from the wide variety of sources. It also committed to developing a series of internet portals (MyWaterQuality.com) to provide this data to the public. A Bay Delta Estuary portal is being developed jointly by the Water Board, IEP and the State and federal water contractors.

Development of a water quality RMP for the Delta and its watersheds will be an incremental process. In the Delta, the Central Valley Water Board has taken initial steps, focusing on the contaminants-related monitoring under its direct control. In March 2011, the Water Board issued the first Pulse of the Delta, providing an accessible summary of recent Delta water quality information related to ammonia, pyrethroid pesticides and other contaminants of emerging concern. The second "Pulse", scheduled for publication in July 2012, will highlight mercury, sediment quality and nutrients. The Board is also developing governance and finance options for the RMP, and working with dischargers to achieve more integrated monitoring, amending regulatory requirements as appropriate.

In the San Joaquin watershed, EPA has made a similar investment, in collaboration with the Water Boards and others. The Central Valley Watershed Monitoring Directory was built to promote and facilitate improved coordination of water monitoring across the basin. In March 2010, EPA produced a "Proposed Strategy for San Joaquin River Basin Water Quality Monitoring and Assessment". EPA is currently funding the Coalition for Urban and Rural Environmental Stewardship (CURES) to implement this strategy. As part of that effort, in February 2012, CURES convened a workshop "Who's Watching the San Joaquin River". This forum brought together agricultural and municipal water districts and federal and state agencies to discuss their respective water quality monitoring programs, the questions they are trying to answer and what they're learning from the data, and the potential benefit of increasing regional collaboration. A second workshop in July will focus on the next steps for setting up an RMP.

As the San Joaquin and Delta RMP efforts proceed, coordination with the IEP and the Delta Science Program is essential, especially as the IEP considers expanding its role to include more contaminant monitoring and/or additional monitoring upstream. Recently, as the IEP recognized the importance of more timely synthesis and assessment of data, it formed a Management, Assessment, and Synthesis Team (MAST) to draw conclusions based on the most recent studies. The nascent RMPs should consider supporting MAST and leveraging its expertise. Inclusion of the Central Valley Water Board on the IEP Memorandum of Understanding would foster this collaboration.

All of these monitoring and assessment efforts should be informed by recent work funded by the CALFED and Delta Science Programs, "Framework for a Unified Monitoring, Assessment and Reporting Program (UMARP) for the Bay-Delta"<sup>18</sup>.

### **3. Implementing Total Maximum Daily Loads (TMDLs)**

#### **EPA will work with the Water Boards to accelerate Bay Delta Estuary water quality**

<sup>18</sup> Framework for A Unified Monitoring, Assessment and Reporting Program (UMARP) for the Bay-Delta, 2010 Report. Available at: <http://deltacouncil.ca.gov/science-program-event-products>

## **restoration through improving the implementation of Total Maximum Daily Loads (TMDLs).**

TMDLs are an important catalyst for restoring impaired water quality. They establish a technical foundation for identifying pollutant load reductions and actions needed to achieve water quality standards. California has strong TMDL implementation plans and regulatory authorities, relative to other states, to address polluted runoff, habitat loss, and habitat degradation.

The Water Boards prioritize TMDLs based on the severity of impairments. There are nine adopted TMDLs in the San Francisco Bay Delta Estuary addressing stressors that EPA identified in the ANPR as having the most significant impact on fish populations (see Table 1 on page 23). These TMDLs are designed to eliminate selenium and pesticide caused aquatic toxicity and to remove low dissolved oxygen (DO) conditions that kill fish and block fish migration. Selenium and pesticides and poor habitat conditions, like low dissolved oxygen, are linked to declining resident and migratory fish populations. There are also four EPA-approved mercury TMDLs in the Bay Delta Estuary (see Table 2 on page 26).

We are including mercury TMDLs in the Action Plan because mercury and methylmercury pose unique water management challenges in the Bay Delta Estuary. Mercury contamination negatively affects aquatic dependent wildlife, commercial fishing, and public health. Mercury is transformed to toxic methylmercury in low oxygen conditions that are present in wetlands. Large-scale tidal and freshwater wetland restoration is proposed on mercury contaminated sites in the Delta to provide habitat needed for protecting and increasing populations of resident and migratory fish. (See action #6 for information on activities to minimize the formation and mobilization of methylmercury).

Although TMDLs in the Bay Delta Estuary have succeeded in reducing pollutant loads, they also illustrate challenges to fully achieving load limits and attaining water quality standards, as shown in Table 1. DO levels in the Stockton Deepwater Ship Channel exceed the standard despite improvement in DO values as a result of upgrading the Stockton wastewater treatment plant to tertiary treatment and installing an aerator in the ship channel. Water quality standards have been achieved in Salt Slough and Grasslands Marsh by reducing selenium loads by two-thirds (from 1996 to 2007) through water management improvements and redirecting contaminated flow to Mud Slough. The selenium load reductions needed to attain water quality standards in Mud Slough have not yet been met. Diazinon and chlorpyrifos TMDL implementation activities resulted in meeting diazinon water quality standards on 79-river miles in the Sacramento and Feather River systems and in Bay Area urban streams. However, the majority of river miles identified as impaired by these pesticides in the Bay Delta Estuary still have levels which exceed water quality standards, and many now have pyrethroid pesticides that cause aquatic toxicity.

EPA is strengthening efforts to support and promote TMDL implementation. TMDL implementation refers to completing required TMDL actions, achieving load limits, and removing water quality impairments. EPA oversight of TMDL implementation can improve accountability and help align grant and program activities to ensure timely achievement of load limits and removal of impairments. EPA has identified several additional actions to address TMDL implementation challenges in the Bay Delta Estuary:

First, EPA will work with the Water Boards to assess progress in implementing approved TMDLs. This will begin with the TMDLs (identified in Table 1) for the contaminants EPA believes are of most importance to aquatic species in the Bay Delta Estuary. California began reporting TMDL implementation reporting progress in the California Water Boards' 2010-2011 Annual Performance Report.<sup>19</sup> EPA will build on this effort by working with the Water Boards to identify complete, incomplete and overdue actions for TMDLs listed in Tables 1 and 2; evaluate overdue actions for present day utility to achieve load limits, create a list of priority TMDL actions; identify methods for completing these actions; and confirm target dates for achieving TMDL load limits. This is the beginning of a regular and sustained effort by EPA to improve oversight of progress towards achieving water quality restoration goals specified in the Bay Delta Estuary TMDLs.

Second, EPA will expand the use of watershed plans and decision tools to improve the efficiency and effectiveness of management practices necessary to achieve TMDL pollutant load reductions. Decision tools can identify cost effective, individual TMDL actions focused on achieving water quality goals. For example, EPA worked with DWR and other partners to develop a pesticide risk assessment model, the "Spatial and Temporal Quantification of Pesticide Loadings to the Sacramento River, San Joaquin River, and Bay-Delta", that identifies the best locations and times for BMP installation based on the presence of sensitive aquatic life and pesticide use. This information should be used to minimize aquatic life exposure to land-applied pesticides by informing choices about the type, location, and timing of BMPs. EPA will help make this tool widely available to potential users and encourage its use in relevant efforts. For example, this model could be used to optimize funding decisions by informing choices about priority implementation areas for programs such as the California Nonpoint Source Program (CWA Section 319 funds) and the new Natural Resources Conservation Service' Bay Delta Initiative (EQIP and WRP funds). Decision makers will have better information to make cost-effective implementation decisions to improve water quality and aquatic habitats by developing watershed plans and decision tools based on TMDLs.

Third, EPA will assist the Water Boards in developing tracking and accounting tools to document and publicly report TMDL progress. Reliable tracking and accounting of pollutant reduction efforts are essential for program managers and policy makers to determine if current strategies are sufficient or if new strategies are necessary to meet TMDL milestones and goals. In addition, accurate and transparent tracking and accounting are critical to maintaining public

#### **4. Selenium water quality standards**

**In 2012, EPA will draft the technical basis for new site-specific numeric selenium criteria for protecting aquatic and terrestrial species dependent on the aquatic habitats of the Bay Delta Estuary.**

EPA's selenium work continues a decade-long effort responding to scientific evidence that the current selenium water quality standards do not adequately protect sensitive species. In 2000,

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<sup>19</sup> State Water Resources Control Board The California Water Boards' Annual Performance Report - Fiscal Year 2010-11. [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1011/](http://www.waterboards.ca.gov/about_us/performance_report_1011/)

US FWS and NOAA-Fisheries drafted a Jeopardy Biological Opinion for the selenium criteria which EPA proposed in the California Toxics Rule. To avoid a final jeopardy opinion, EPA agreed to develop site-specific water quality criteria for selenium, beginning in the Bay Delta Estuary. EPA is using an ecosystem-based model created by the U.S. Geological Survey (USGS)<sup>20</sup> along with advice from the US FWS and NOAA-Fisheries. The model reflects the food web in the Bay Delta Estuary, the diet of sensitive species and their use of habitats, and hydrological conditions. Certain threatened and endangered species, including sturgeon, salmon and certain birds, feed on clams. Clams bioaccumulate selenium. More stringent selenium water quality criteria will decrease allowable concentrations of selenium in surface waters of the Bay Delta and in the tissue of fish and wildlife, and therefore reduce the chronic (long-term) exposure of sensitive species to selenium.

Following the development of the Bay Delta selenium criteria, site-specific criteria will be developed for the San Joaquin Valley watershed, as well as other parts of California. EPA is engaged in other efforts to minimize selenium discharges to the San Joaquin River and the Bay Delta Estuary, including the Grasslands Bypass Project and the North San Francisco Bay TMDL. These are outlined in Appendix I beginning at page 2.

## **5. Pesticide pollution prevention**

**EPA will help ensure that Federal regulation of pesticides under FIFRA more fully considers effects on aquatic life and work with our partners to minimize pesticide pollution in urban runoff.**

EPA is committed to minimizing pesticide-caused aquatic toxicity by improving the national pesticide registration review process. In California, pesticides registered by EPA under FIFRA have been found to cause aquatic toxicity and water quality impairments, even though they are applied in full compliance with FIFRA requirements. Data regarding these impacts is essential to a more thorough evaluation during the pesticide registration review process which is done every 15 years by the EPA Office of Pesticide Programs (OPP) in Washington DC. EPA Region 9 is working with California Water Boards and EPA-OPP to ensure OPP has the most currently available pesticide water quality data. California data will help OPP improve water quality risk assessments and develop the necessary use and guidance restrictions that can help prevent pesticide water quality problems in the future. OPP is also initiating a pesticide usage pilot project to improve endangered species ecological risk assessments for pesticides in registration review.

EPA will work with the Water Boards and other partners to mitigate pesticide pollution in urban runoff. EPA supports the inclusion of measurable and enforceable Low Impact Development (LID) requirements in all municipal separate stormwater sewer system (MS4) permits for new development and redevelopment to minimize pollution from new urban development. The Central Valley RWQCB has the opportunity to use LID requirements for minimizing pollutants in urban runoff when they update MS4 permits for the cities of Sacramento, Modesto, and Stockton which all expire within the next two years.

EPA also recommends including LID requirements in CWA Section 401 Water Quality Certifications. CWA Section 401 applies development projects that require a CWA Section 404

<sup>20</sup> Theresa Presser & Samuel N. Luoma, *A Methodology for Ecosystem-Scale Modeling of Selenium* (2010). <http://onlinelibrary.wiley.com/doi/10.1002/ieam.101/full>

permit from the Army Corps of Engineers. These projects include many new residential and commercial developments. If aquatic toxicity from urban runoff persists in the Bay Delta Estuary and its tributaries, EPA recommends the Central Valley Water Board evaluate the use of residual designation authority to establish a Delta Region Municipal MS4 permit.

EPA is investing in pesticide pollution prevention efforts by funding the San Francisco Estuary Partnership's (SFEP) Pesticide Reduction Campaign. SFEP will promote less toxic pesticide options through educating retail employees who sell pesticides as well as Bay area residents.

EPA has identified several other actions to support California's groundbreaking work to minimize pesticide discharges and accelerate the restoration of water quality in the Bay Delta Estuary. These are outlined in Appendix I beginning at page 12.

## **6. Methylmercury (MeHg) controls in Delta wetlands**

**EPA will support implementation of the Delta MeHg TMDL by contributing to research and technology transfer of methods to control methylation of mercury in wetlands. Specifically, EPA will provide funding to USGS to study whether treatment technology used for carbon capture in the Delta can also sequester MeHg in the accreting wetlands. In the Yolo Bypass, EPA will collaborate on proposed restoration projects to ensure MeHg is effectively managed during both the near-term restoration phase and the long-term stewardship phase. In addition, EPA will contribute to the restoration of aquatic habitats at Dutch Slough as well as the control of mercury sources within the Marsh Creek watershed.**

Restoring wetlands in and near the Delta is an essential component of reviving the Estuary's health. However, nearly all the locations targeted for habitat restoration in the Delta have been, or are at risk of being, contaminated with mercury from historical mining sources and ongoing air deposition from industry. This mercury can be transformed into MeHg by the anaerobic (low oxygen) conditions prevalent in wetlands. This toxic form of mercury can accumulate in aquatic organisms and people that eat certain fish. Health advisories have been issued for the Delta and several upstream rivers.<sup>21</sup> Given the long-term benefits of restoring aquatic habitats in the Delta (as well as the health benefits of eating fish), preventing the formation and mobilization of methylmercury in wetlands is critical. Scientific methods are being explored to prevent MeHg formation.

USGS has demonstrated on Twitchell Island that growing tules can rebuild peat soils, reverse subsidence, and sequester carbon dioxide. With DWR support, USGS is now studying the methane emissions from the restored wetlands and the treatment options for dissolved organic carbon (DOC) to safeguard water quality. EPA research funds will augment this work by enabling USGS to study whether the treatment technology used for DOC could also be used to sequester MeHg in the accreting wetlands.

Work is also under way in the Cosumnes River Preserve. Using Clean Water Act Section 319(h) monies (\$832,000), the Water Board has funded the Bureau of Land Management, in cooperation with USGS, to develop management measures for ricelands to minimize the formation and transport of MeHg, including the control of irrigation water and the harvesting of organic matter specifically.

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<sup>21</sup> New report – see lyrics last week



EPA will also collaborate on proposed restoration projects within the Yolo Bypass to ensure MeHg is effectively managed during both the near-term restoration phase and the long-term stewardship phase. The 59,000-acre Yolo Bypass was constructed as a flood control feature and retains some of its pre-settlement floodplain functions as it supports 42 species of fish, 200 species of birds, and an abundance of phytoplankton and zooplankton. Proposed restoration projects include increasing the areal extent of aquatic habitat beyond that already contained in the Yolo Wildlife Area and renovating weirs that have proved harmful to fish. However, sediments within the Bypass are contaminated with mercury and could provide the substrate necessary for the formation of methylmercury. In addition, Cache Creek transports mercury from abandoned mercury mines in the Coast Range to the Cache Creek Settling Basin and eastward to the Bypass, and accounts for 60% of all the mercury discharged within the Central Valley. EPA's Superfund Program has already substantially controlled mercury releases from the Abott/Turkey Run Mine and the Sulphur Bank Mercury Mine at Clear Lake, upstream of Cache Creek. EPA will build on these efforts to further reduce the environmental threats posed by methylmercury.

In addition, EPA has contributed \$1.5 million to assist the California Coastal Conservancy restore tidal marsh and related habitats on the 1,166-acre Dutch Slough property in Contra Costa County, where Marsh Creek enters the Delta at Big Break. Marsh Creek receives acid mine drainage from the abandoned Mount Diablo Mercury Mine situated 30 miles upstream from Dutch Slough, and mercury-laden sediment occupies space within the Marsh Creek Reservoir upstream from Dutch Slough. EPA will work with stakeholders to ensure MeHg is effectively managed at Dutch Slough. The Dutch Slough Restoration Project presents a rare opportunity to restore tidal marsh and a floodplain on the delta of a creek, and to do so in a way that prevents the formation and transport of MeHg as anaerobic processes take hold on a newly restored tidal marsh. EPA is also funding the Friends of Marsh Creek, through EPA's Urban Waters Initiative, to help the local community improve water quality through pollution prevention, best management practices for agricultural discharges, and appropriate creekside land uses.

These projects will provide lessons learned that may be applicable to other restoration projects in the Delta region. EPA will assist with this transfer this information. More detail is in Appendix I beginning at page 42.

## **7. Bay Delta Conservation Plan**

**EPA supports the Bay Delta Conservation Plan (BDCP) as one of the means of meeting the co-equal goals established by the California legislature – a more reliable water supply and a restored Delta ecosystem.** As the BDCP is an ESA vehicle, EPA does not have a direct regulatory role. However, under the Clean Air Act Section 309, EPA will be reviewing and commenting on NEPA documents for the BDCP. In addition, EPA shares permitting responsibilities under CWA Section 404 with the U.S. Army Corps of Engineers (Corps), and several BDCP projects will require 404 permits. EPA also has an interest in how changes in Delta hydrology caused by BDCP implementation might affect attainment of water quality standards in the Delta.

Given these interests, EPA has agreed to be a Cooperating Agency for the BDCP EIS to provide early input to the lead agencies (Department of Water Resources, Department of Fish and Game, Bureau of Reclamation, US FWS, and NOAA-Fisheries) on the draft EIR/EIS.<sup>22</sup> We are also working with the Corps and the lead agencies to integrate CWA requirements into the process of

NEPA and ESA compliance so that CWA permitting of BDCP projects can proceed efficiently.

In both these capacities (NEPA and 404), EPA will focus on three issues. The first is antidegradation. Any change in the location and operations of Delta water diversions must not further impair water quality in the Estuary. The Central Valley watershed is the source of many pollutants of concern in the Delta, including pesticides, nutrients (including ammonia), selenium, and mercury. All of the water bodies in the Bay Delta Estuary have been identified as “impaired” (i.e. not meeting water quality standards) for one or more parameters. Existing concentrations and loads of contaminants entering the Delta from upstream harm the health of the Delta ecosystem as well as the upstream waters. In particular, large storm pulses can flush contaminants into the Delta. Changes in the location, timing, and amount of Delta diversions could exacerbate this problem, given reduced Delta inflow from the Sacramento River and more degraded San Joaquin water flowing into the Delta (rather than to the south Delta export facilities).

In addition to contaminants, EPA is concerned with the location and areal extent of the low salinity zone (LSZ), the area of the estuary where sea water mixes with fresh river water creating important habitat. Many estuarine organisms show greater abundance or improved survival when the LSZ is located in the broad, complex shallows of Suisun Bay rather than in the simple, rock-lined channels of the Western Delta. The location and operation of Delta export facilities can significantly affect the location of the LSZ. This is of particular concern given the record low levels of some pelagic fish species over the last decade.

Secondly, any new Delta diversion and conveyance facilities will have substantial impacts (direct and indirect) to “waters of the U.S.”, including the Sacramento River and other Delta tributaries, sloughs and wetlands, depending on its location. Pursuant to EPA’s shared responsibilities with the Corps, EPA will assist the Corps during the CWA 404 permitting process by: helping to verify the jurisdictional determination of the extent of impact to waters and wetlands; assessing the CWA Alternatives Analysis to ascertain the “Least Environmentally Damaging Practicable Alternative”; and reviewing the compensatory mitigation proposed for any unavoidable impacts to waters of the U.S.

Lastly, we continue to be concerned about any BDCP alternatives which would significantly increase water diversions out of the Delta. The California legislature and the Delta Stewardship Council (as well as many scientists) have identified a need to reduce reliance on the Delta for water supply. We are encouraged by the position of the lead federal agencies for the BDCP that the Purpose and Need Statement of the BDCP “is not intended to imply that increased quantities of water will be delivered under the BDCP.”<sup>23</sup> We are also optimistic that the State Water Board’s upcoming review of the Bay-Delta Water Quality Control Plan will appropriately address this California policy. Completion of the Board’s work is essential for fully informed decisions on the BDCP.<sup>24</sup>

<sup>22</sup> [http://www.epa.gov/sfbay-delta/pdfs/EPA\\_CooperatingAgencyStatus\\_BDCP\\_111208.pdf](http://www.epa.gov/sfbay-delta/pdfs/EPA_CooperatingAgencyStatus_BDCP_111208.pdf)

<sup>23</sup> <http://www.epa.gov/sfbay-delta/pdfs/LeadFedAgncysBdcpPurpose-NeedLtrOct262010.pdf>

<sup>24</sup> A similar comment was made by the Delta Stewardship Council to the State Water Board on April 18, 2012. [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/bay\\_delta\\_plan/comments\\_042512/joseph\\_grindstaff.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/comments_042512/joseph_grindstaff.pdf)

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**Table 1: TMDLs in the San Francisco Bay Delta Estuary Addressing Aquatic Resource Impairments Identified in the ANPR**

TMDL Pollutant/Stress or and water body (EPA Approval Date)	Primary Pollutant Sources & Allocations	Target Compliance Date	Load Reduction Progress
			Load Limits Achieved
<b>Selenium Salt Slough</b> (1999)	<ul style="list-style-type: none"> <li>Major: Shallow ground water drainage (agricultural tile drainage) from the 97,000-acre Drainage Project Area of the Grassland Watershed (88% of total load)</li> <li>Minor: Distributed inputs throughout the San Joaquin River Basin</li> <li>100% load allocation for non point source</li> </ul>	October 2010 <sup>1</sup>	<ul style="list-style-type: none"> <li>Selenium loads reduced by two-thirds (1996-2007) through water &amp; crop management.</li> <li>Selenium contaminated shallow ground water drainage is routed away from Salt Slough to achieve load limits (balance)</li> <li>Selenium removed as impairment from Salt Slough on 303(d) List</li> </ul>
<b>Selenium Grasslands Marshes</b> (2000)	<ul style="list-style-type: none"> <li>Major: Shallow ground water drainage (agricultural tile drainage) from the 97,000-acre Drainage Project Area of the Grassland Watershed (88% of total load)</li> <li>Minor: Distributed inputs throughout the San Joaquin River Basin</li> <li>100% load allocation for non point source</li> </ul>	October 2010 <sup>1</sup>	<ul style="list-style-type: none"> <li>Selenium loads reduced by two-thirds (1996-2007) through water &amp; crop management.</li> <li>Selenium contaminated shallow ground water drainage is rerouted away from Grasslands Marsh to achieve load limits</li> <li>Selenium removed as impairment from Grasslands Marshes on 303(d) List</li> </ul>
<b>Selenium Lower San Joaquin River</b> <sup>2</sup> (2003)	<ul style="list-style-type: none"> <li>Major: Subsurface agricultural return flows (tile drainage) from the 97,000-acre Drainage Project Area of the Grassland Watershed (88% of total load)</li> <li>Minor: Distributed inputs throughout the San Joaquin River Basin</li> <li>100% load allocation for non point source</li> </ul>	December 2019	<ul style="list-style-type: none"> <li>Selenium loads reduced by two-thirds (1996-2007) through water &amp; crop management.</li> <li>Selenium removed as impairment downstream of the confluence with the Merced River on 303(d) list</li> <li>Standards not yet achieved for Mud Slough North, from the end of the San Luis Drain to the San Joaquin River and in the San Joaquin River from Mud Slough, North, to the Merced River.</li> </ul>
<b>Diazinon &amp; Chlorpyrifos Sacramento County Urban Streams</b> <sup>3</sup> (2004)	<ul style="list-style-type: none"> <li>Urban runoff from applications of pesticide in non-agricultural areas</li> </ul>	September 2013	<ul style="list-style-type: none"> <li>Elk Grove Creek impairment removed from 303(d) List??</li> <li>Registration cancelled for most non-agricultural uses.</li> <li>Other streams remain impaired -- pollutants exceed water quality objectives and significant pesticide toxicity</li> <li>Load limits achieved?</li> </ul>
<b>Low Dissolved Oxygen (DO) Stockton Deep Water Ship Channel</b> (2007)	<ul style="list-style-type: none"> <li>WWTP, urban and rural runoff sources of oxygen demanding substances<sup>5</sup> (e.g, organic nutrients).</li> <li>Ship channel geometry.<sup>6</sup></li> <li>Reduced flow.<sup>7</sup></li> <li>TMDL assigns equal responsibility of impairment to all three factors.</li> </ul>	December 31, 2011	<ul style="list-style-type: none"> <li>Substantial reduction in organic nutrient discharges from Stockton WWTP.</li> <li>Installation of aerator.</li> <li>DO levels improving, but are still too often below the objective.</li> <li>Load limits achieved for urban runoff?</li> </ul>

<b>Diazinon &amp; Chlorpyrifos Lower San Joaquin River<sup>4</sup> (2006)</b>	<ul style="list-style-type: none"> <li>Primarily agricultural applications.</li> <li>Load and wasteload allocations are equal to the Delta Loading Capacity. footnote def of loading capacity</li> </ul>	2011	<ul style="list-style-type: none"> <li>2010 monitoring shows diazinon concentrations below objective</li> <li>Approximately 46 miles of San Joaquin River de-listed for diazinon; 85 miles remain on the 303(d) list for diazinon.</li> <li>Chlorpyrifos concentrations exceeding objectives.</li> <li>130 mile segment of San Joaquin River still on 303(d) list for chlorpyrifos.</li> </ul>
<b>Diazinon &amp; Pesticide-Related Toxicity Bay Area Urban Creeks (2007)</b>	<ul style="list-style-type: none"> <li>Urban runoff that contains pesticides as a result of pesticide application for structural pest control, landscape maintenance, agricultural, and other pest management purposes.</li> <li>100% of the TMDL is allocated to urban runoff as a "wasteload allocation" to stormwater point sources</li> </ul>	Adjusts to changes in pesticides causing toxicity	<ul style="list-style-type: none"> <li>Diazinon registration cancelled for most non-agricultural uses and is no longer the source of aquatic toxicity.</li> <li>Aquatic toxicity in urban streams is caused by pyrethroid pesticides, which replaced diazinon in the marketplace and in urban streams</li> <li>Pesticide-related toxicity load limits are not met. Load limits are met for diazinon.</li> </ul>
<b>Diazinon &amp; Chlorpyrifos Sacramento-San Joaquin River Delta (2007)</b>	<ul style="list-style-type: none"> <li>Primarily agricultural applications.</li> <li>Load and wasteload allocations are equal to the Delta Loading Capacity.</li> </ul>	December 1, 2011	<ul style="list-style-type: none"> <li>2011 monitoring shows diazinon concentrations below objective and chlorpyrifos concentrations exceeding objectives.</li> <li>2011 monitoring shows chlorpyrifos concentrations exceeding objectives.</li> <li>All waters in Delta remain on 303(d) List in for diazinon &amp; chlorpyrifos.</li> </ul>
<b>Diazinon &amp; Chlorpyrifos Lower Feather River and Lower Sacramento River<sup>5</sup> (2008)</b>	<ul style="list-style-type: none"> <li>Primarily agricultural applications.</li> <li>Load and wasteload allocations are equal to the Delta Loading Capacity objectives).</li> </ul>	2010	<ul style="list-style-type: none"> <li>Diazinon impairment removed from 79-river miles of Lower Sacramento and Feather Rivers.</li> <li>Chlorpyrifos impairment remains on Lower Feather River.</li> <li>Load limits &amp; objectives met for diazinon and chlorpyrifos on Lower Sacramento.</li> <li>Load limits objectives met for diazinon on Lower Feather River.</li> </ul>

- The 5 µg/L four-day average water quality objective for the SJR below the Merced River must be met in above normal and wet years starting in water year 2006. The 5 µg/L four-day average objective must be met for critically dry, dry and below normal years starting in water year 2011. The 5 µg/L four-day average water quality objective must also be met for all year types in Mud Slough and the SJR from Sack Dam to the Merced River starting in water year 2011.
- 50 miles of Lower San Joaquin River between Salt Slough (upstream border) and Vernalis at Airport Way Bridge (downstream border).
- Arcade Creek, Elder Creek, Elk Grove Creek, Morrison Creek, Chicken Ranch Slough, and Strong Ranch Slough.
- 130 miles of Lower San Joaquin River from Mendota Dam to Vernalis at Airport Way bridge.
- Stockton WWTP, algae loads from the watershed, and urban and agricultural runoff.
- Channel geometry reduces the assimilation capacity of oxygen demanding substances in three ways: 1) the deep wide channel reduces water velocity, increasing water residence time, concentration of organic material, and consumption of available oxygen; 2) the small water surface area to depth ratio reduces the proportion of water that is naturally aerated at the water air surface; and 3) poor light penetration, the result of increasing the concentration of organic material, encourages algal death and consumption of oxygen through decay process.
- Reduced flows from San Joaquin River water diversions to the State and Federal water projects, water transfers, and in basin diversions reduce reduces the assimilation capacity of oxygen demanding substances by reduces water velocity, increasing water residence time, and concentration of organic material which consumes available oxygen.
- Sacramento River below Shasta Dam, Feather River below Oroville Dam.

**Table 2: Mercury and Methylmercury TMDLs in San Francisco Bay Delta Estuary Watershed**

<b>TMDL Pollutant/Stressor and water body (EPA Approval Date)</b>	<b>Primary Pollutant Sources &amp; Allocations</b>	<b>Target Compliance Date</b>	<b>Implementation Progress</b>
<b>Mercury Clear Lake (2003)</b>	<ul style="list-style-type: none"> <li>100% Load Allocation = nonpoint sources, Sulphur Bank mercury mine, atmospheric deposition, tributaries,</li> </ul>	2023	<ul style="list-style-type: none"> <li>Implementation activities at Sulphur Bank mine are occurring.<sup>1</sup></li> <li>Water quality monitoring is done for special studies and associated with individual actions.</li> <li>Monitoring data is not easily available and a periodic monitoring program has not been established.</li> </ul>
<b>Mercury Cache, Bear, &amp; Sulphur Creeks &amp; Harley Gulch (2007)</b>	<ul style="list-style-type: none"> <li>100% Load Allocation = nonpoint sources, mercury mines</li> </ul>	2027 <sup>2</sup>	<ul style="list-style-type: none"> <li>Implementation activities at Sulphur Bank mine are occurring.</li> <li>Water quality monitoring is done for special studies and associated with individual actions.</li> <li>Monitoring data is not easily available and a periodic monitoring program has not been established.</li> </ul>
<b>Mercury San Francisco Bay (2008)</b>	<ul style="list-style-type: none"> <li>Load Allocation = 85% to bed erosion, upstream watersheds, atmospheric deposition, non-urban and stormwater runoff.</li> <li>Waste Load Allocation is ~ 15% of sources including NPDES facilities and MS4 outfalls.</li> </ul>	2030	<ul style="list-style-type: none"> <li>Waiting on N. Feger to provide some info on implementation and WQ.</li> </ul>

<b>Mercury &amp; Methylmercury Guadalupe River Watershed (2010)</b>	<ul style="list-style-type: none"> <li>• ~85% Load Allocation. Nonpoint sources = mining waste, impoundments (tributary lakes and reservoirs), and atmospheric deposition.</li> <li>• ~ 15% Waste Load Allocation to urban storm water point sources (MS4s).</li> </ul>	2030	<ul style="list-style-type: none"> <li>• Waiting on N. Feger to provide some info on implementation and WQ.</li> </ul>
<b>Mercury &amp; Methylmercury Sacramento-San Joaquin Delta (2011)</b>	<ul style="list-style-type: none"> <li>• Load Allocation = 96% to Nonpoint sources including: Agricultural drainage, Atmospheric wet deposition, Open water, Tributary Inputs, Inputs from Upstream Subareas, Urban (nonpoint source), Wetlands.</li> <li>• Waste Load Allocation is ~ 4% of sources including NPDES facilities and MS4 outfalls.</li> </ul>	2030	<ul style="list-style-type: none"> <li>• Workplans for phase I control studies are being created.</li> <li>• Water quality monitoring will be part of control studies and other implementation actions.</li> <li>• Monitoring data will be made available after it is generated.</li> </ul>

1. Clear Lake Mercury TMDL 2010 Update [http://www.swrcb.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/clear\\_lake\\_hg/cl\\_final\\_tmdl\\_5yr\\_update.pdf](http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/clear_lake_hg/cl_final_tmdl_5yr_update.pdf)
2. Target date for load reduction achievement – 15 – 20 years after implementation of mercury control program; 5 – 10 additional years after water column objectives are met to reduce fish tissue concentrations to objective concentrations.

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